

WHAT IS CLAIMED IS:

1. A multi-modal browser, comprising:
 - a model manager for managing a model comprising a modality-independent representation of an application, and
- 5 a plurality of channel-specific controllers, wherein each controller processes and transforms the model to generate a corresponding channel-specific view of the model, wherein the channel-specific views are synchronized by the model manager such that a user interaction in one channel-specific view is reflected in another channel-specific view.
- 10 2. The multi-modal browser of claim 1, wherein the model manager updates and maintains a dialog state of the model, wherein a user interaction within a given view will update a dialog state of the model.
3. The multi-modal browser of claim 1, wherein the model manager maintains conversation history and context.
- 15 4. The multi-modal browser of claim 1, wherein each view is generated by transforming the modality-independent representation of the model to a modality-specific representation.

5. The multi-modal browser of claim 1, wherein the model is programmed using a single authoring framework.

6. The multi-modal browser of claim 5, wherein the single authoring framework comprises a separate an interaction logic layer that encapsulates interaction logic in a modality-independent framework.

7. A multi-modal browser, comprising:
a plurality of modality-dependent browsers; and
a multi-modal shell for parsing and processing a modality-independent application and managing synchronization of I/O (input/output) events across each view generated by
10 the plurality of modality-dependent browsers, wherein each modality-dependent browser comprises:
an API (application programming interface) for controlling the browser and for managing events; and
a wrapper interface comprising synchronization protocols for supporting
15 synchronization of the browser.

8. The multi-modal browser of claim 7, wherein the API for a modality-dependent browser comprises a DOM (document object model) interface.

9. The multi-modal browser of claim 8, wherein the wrapper interface comprises methods for DOM event filtering.

10. The multi-modal browser of claim 7, wherein the multi-modal shell maintains and updates a dialog state of the application.

5

11. The multi-modal browser of claim 7, wherein the multi-modal browser comprises a fat client framework.

12. The multi-modal browser of claim 7, wherein the multi-modal browser comprises a distributed framework.

10 13. The multi-modal browser of claim 7, wherein the multi-modal shell comprises:
a model manager for maintaining a dialog state of the application;
a TAV (transformation/adaption/view preparation) manager for preparing and transforming pages or page snippets; and
15 a synchronization manager for managing event notifications to the browsers.

14. The multi-modal shell of claim 13, wherein the multi-modal shell comprises a distributed framework.

15. The multi-modal browser of claim 7, wherein the plurality of modality-dependent browsers comprise a WML (wireless markup language) browser and a VoiceXML browser.

16. The multi-modal browser of claim 15, further comprising an audio system 5 for capturing and encoding speech data, and a plurality of speech engines for processing speech data.

17. A WAP (wireless application protocol) multi-modal browser, comprising:
10 a GUI (graphical user interface) browser comprising a DOM (document object model) interface for controlling the GUI browser and managing DOM and event notification and a wrapper interface for filtering events;
15 a speech application server comprising: a voice browser, wherein the voice browser comprises a DOM interface for controlling the voice browser and event notification and a wrapper interface for filtering events; an audio system for capturing and encoding speech data; and one or more speech engines for processing speech data; and a multi-modal shell for parsing and processing a modality-independent application and managing synchronization of I/O (input/output) events between the GUI and voice browsers.

18. The WAP multi-modal browser of claim 17, wherein the GUI browser comprises a WML (wireless markup language) browser and wherein the voice browser comprise a VoiceXML browser.

19. The WAP multi-modal browser of claim 17, wherein the GUI browser
5 resides on a local client device and the speech application server is distributed over a network.

20. The WAP multi-modal browser of claim 19, further comprising a communication manager that employs protocols for transporting encoded voice data to the speech engines and protocols for enabling synchronization of the GUI browser.

10 21. The WAP multi-modal browser of claim 19, wherein the speech application server supports protocols for enabling remote control of the engines for server side speech processing.

22. The WAP multi-modal browser of claim 19, wherein the multi-modal shell is distributed over the network.

15